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**Title:** Direct culture-free electrochemical detection of Salmonella cells in milk based on quantum dots-modified nanostructured dendrons

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**Abstract:** With regard to global food safety and preventing the spread of diseases caused by foodborne pathogens or their toxins, there is an increasing need for simple and rapid methods for the screening of such pathogens. We aimed to develop a fast and efficient biosensor for the screening of milk samples contaminated by Salmonella spp. and provide a quick and cost-effective method as an alternative to the time-consuming conventional cultivation- or PCR-based approaches. We exploited a simple but highly specific technique whereby bacterial cells were separated immunomagnetically, with subsequent reaction with conjugate; i.e. specific IgG molecule labelled with an electrochemically potent indicator. The unique structure of this indicator exploits the benefits of hyperbranched dendron molecules and heavy metal-derived quantum dots (QDs). Square-wave anodic stripping voltammetry (SWASV) using of screen-printed carbon electrodes with in situ formed Bi(III) film (BiSPCE) was used for the detection and quantification of metal ions released from the QDs (CdTe) after their acidic dissolution. The metal ion signals proportionally correlate with the amount of captured bacteria cells. By this method, the presence of Salmonella spp. was proven in 2.5 h even in minimal number of bacterial cells (4 CFU) in 1 mL of the sample. (C) 2020 Elsevier B.V. All rights reserved.

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